REMARKS

The abstract and specification have been amended in order to correct grammatical and idiomatic errors contained therein. No new matter has been added.

In order to expedite the prosecution of the present application, Claim 1 has been amended to state that the electroless copper plating solution contains a water-soluble nitrogen-containing polymer and glyoxylic acid and phosphinic acid as reducing agents in the electroless copper plating solution. Claim 5 has been amended in order to address the rejection thereof under 35 USC 112, second paragraph. Specifically speaking, a positive recitation of a step being performed is now contained in Claim 5. No new matter has been added.

Claims 1, 2 and 5 have been rejected under 35 USC 102(b) as being anticipated by Amelio et al. Claims 1 and 2 have been rejected under 35 USC 102(b) as being anticipated by Japan 03-287779 (hereinafter referred to as JP '779). Claim 3 has been rejected under 35 USC 103(a) as being unpatentable over Amelio et al. Claims 3 and 5 have been rejected under 35 USC 103(a) as being unpatentable over JP '779. Applicants respectfully traverse this ground of rejection and urge reconsideration in light of the following comments.

The presently claimed invention is directed to an electroless copper plating solution containing a water-soluble nitrogen-containing polymer and glyoxylic acid and phosphinic acid as reducing agents in the electroless copper plating solution. As discussed in the present specification, the present invention is based on the discovery that when a water-soluble nitrogen-containing polymer is added to an electroless copper plating solution also containing phosphinic acid and glyoxylic acid as reducing agents, the initial plating reactivity through the catalyst metal is higher and, as a result, a uniform plating at lower temperatures on a semiconductor or other mirror surface can be realized. It is

respectfully submitted that the prior art cited by the Examiner does not disclose the presently claimed invention.

The Amelio et al reference discloses an electroless copper plating bath containing a cationic polymer from acrylamide and/or methacrylamide, a cupric ion source, a reducing agent for the cupric ion source and a complexing agent for the cupric ion. Formaldehyde is disclosed as being the preferred reducing agent with formaldehyde derivatives or precursors such as paraformaldehyde, trioxane, dimethylhydantoin, glyoxal, borohydrides and substituted borohydrides also being suitable. However, there is no disclosure in this reference of using both glyoxylic acid and phosphinic acid as a reducing agent in the electroless copper plating solution or the benefits associated therewith. Therefore, Amelio et al does not even present a showing of prima facie obviousness under 35 USC 103(a) of the presently claimed invention.

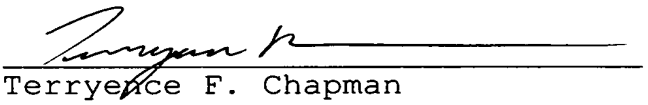
JP '779 discloses an electroless copper plating bath containing a copper compound for supplying a copper complex ion, a reducing agent and a copper ion complexing agent consisting of polyethyleneimine. Hydrazine is specifically disclosed as a reducing agent. Like the previously discussed reference, this reference has no disclosure of utilizing phosphinic acid and glyoxylic acid as reducing agents in the electroless copper plating solution or the benefits associated therewith. Therefore, this reference also does not even present a showing of prima facie obviousness under 35 USC 103(a) with respect to the presently claimed invention.

Although the Examiner has not made a proper showing of prima facie obviousness under 35 USC 103(a) with respect to the presently claimed invention, objective evidence is of record in the present application which is more than sufficient to rebut any proper rejection under 35 USC 103(a). On pages 8-13 of the present specification, there are presented Examples and Comparative Examples which show the unexpected benefits associated with using both glyoxylic acid

and phosphinic acid as reducing agents. Example 4 uses only glyoxylic acid as a reducing agent and Example 5 only used formalin as the reducing agent. The resulting deposited films in these Examples were formed in "little islands and many portions without deposition were observed". This is to be contrasted with the films produced by Examples 1-3 where both glyoxylic acid and phosphinic acid were used as reducing agents. In Examples 1-3, "the plating film was formed uniformly without unevenness and the film thickness was 80 nm." This clearly exhibits that the combination of glyoxylic acid and phosphinic acid is required to form a good film having a uniform surface as opposed to plating solutions containing only either glyoxylic acid or formalin,without using phosphinic acid, which corresponds to the prior art cited by the Examiner and fails to produce a uniform film.

Reconsideration of the present application and the passing of it to issue is respectfully solicited.

Respectfully submitted,



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